REMARKS

The Office Action summary (OAS) indicates claim 42 is rejected. However, page 7 specifically states claim 42 is allowed. Since there is no rejection against claim 42, applicants presume the Office Action Summary is erroneous. In addition, the Office Action Summary does not indicate claims 8 and 9 are pending and does not indicate claim 8 or 9 is rejected. However, the Office Action, on page 2, indicates claims 8 and 9 are rejected under 35 U.S.C. §112, 1st paragraph, and page 4 indicates claims 8 and 9 are rejected under 35 U.S.C. §103(a). Consequently, applicants assume the Office Action Summary is in error and claims 8 and 9 should have been indicated as pending and rejected.

The dependencies of claims 38-40 and 44 have been changed to obviate the objections to the claims and the rejection under 35 U.S.C. §112, Paragraph 2. A clerical type error in claim 33 has been rectified. Claim 1 has been amended for clarity. Claim 1, as previously submitted, required the AC etchant plasma to always be the dominant material applied to the work piece while the feature of the work piece was being formed. As such, the etching and gradual transitions referred to in the claim were inherently concerned with etching and gradual changes associated with formation of the feature. Claim 1 now merely makes such a limitation explicit, instead of implicit.

Entry of the amendment is in order because it is concerned with curing formal matters. The issues associated with the changes to the claims remain the same and have been considered by the Examiner in connection with the Bhardwaj et al. reference. Consequently, there is no need for a new search or consideration of new issues as a result of the amendments. The

amendments were not made at an earlier date because attorney for applicant did not appreciate the possible need for the foregoing amendments. Therefore, entry of the amendment is in order.

Applicants submit herewith a Declaration by Andrew D. Bailey III, Ph.D., who is an expert in the field of plasma processors and has considerable knowledge of those of ordinary skill in the art of plasma processors, as a result of his experience in working in the field for several years and in supervising those of ordinary skill in the art. Dr. Bailey has testified as to why he believes claims 1-6, 8-13, 17, 18, 20-23, 25-26, 28, 30-33, 38, 39, 40, 41, 43 and 44 are improperly rejected under 35 U.S.C. §112, Paragraph 1, and why Bhardwaj et al., USP 6,051,503, does not disclose the features of claims 1-6, 8-13, 17, 18, 20-23, 25, 26, 28, 30-33 and 38-41, as set forth in the Office Action in the paragraph bridging pages 4 and 5 thereof.

Concerning the rejection of claims 1-6, 8-13, 17, 18, 20-23, 25, 26, 28, 30-33, 38, 39, 40, 41, 43 and 44 under 35 U.S.C. §112, first paragraph, Dr. Bailey's Declaration indicates why one of ordinary skill in the art would have known that the applicants were in possession of the requirement for "the AC etchant plasma always being the dominant material applied to the work piece while the feature is being formed" as set forth in claim 1, lines 3-5 and claim 17, lines 8-10. While the application indicates the process can be used for deposition purposes, it is clear that while etching is performed the etchant is the dominant material. In particular, page 16, line 21-page 17, line 7, describes the final etch operation of silicon substrate 202 between point 212 and base 214 of Figure 6 to achieve round edges 216 between point 212 and base 214. The rounded edge is a feature that is formed during the 16 second final etch operation while a suitable mixture of HBr/O_2 constantly flows from sources 68 into chamber 40, while the power that amplifier 132 supplies to electrode 56 gradually decreases from 200 watts to 100 watts. An etch operation would not occur during the 15 second period if the HBr etchant were not a

dominant material over the O_2 passivation gas. The dominance of the HBr etchant over the O_2 passivation gas is indicated in the sentence on page 17, lines 4-6, that indicates the etchant gases are purged from the chamber. If the HBr etchant gas were not dominant, the specification would not have referred to purging the etchant gases from the chamber.

For the foregoing reasons, as well as the reasons set forth in Dr. Bailey's Declaration, the specification as filed does provide a basis for the requirements of claims 1 and 17 for the etchant gas to be a dominant gas that is applied to form the feature.

The rejection of claims 1-6, 8-13, 17, 18, 20-23, 25, 26, 28, 30-33 and 38-41 under 35 U.S.C. §103(a) as being unpatentable over Bhardwaj et al. in view of Howald et al., WO 00/58992, is incorrect. The Office Action indicates a feature of a work piece is a portion of a side wall of the trench. As Dr. Bailey's declaration indicates, such an interpretation of Bhardwaj et al. is completely contrary to the Bhardwaj et al. disclosure which is concerned with etching a feature in a semiconductor substrate by subjecting the substrate to a cyclic process including plural successive process cycles, each including a first process of etching and a second process of depositing a passivation layer. The attention of the Examiner is directed to all of the independent claims of the Bhardwaj et al. patent, i.e., claims 1 and 29-31. Column 1, lines 4-8 indicates the Bhardwaj et al. disclosure is concerned with methods of depositing a side wall passivation layer on etched features and methods of etching such features including the passivation method. Hence, Bhardwaj et al. indicates the features are, for example, a side wall of a trench or recess formed by laying down a passivation layer; see column 1, lines 10-13. Consequently, the Examiner's position that a portion of the side wall of a trench could be considered a feature flies in the face of the words of the Bhardwaj et al. patent.

Page 5 of the Office Action includes the statement that a gradual power change in the Bhardwaj et al. method produces a rounded profile since the gradual power change in the present application produces a rounded profile. The Examiner relies on inherency for such a statement. However, it is improper to rely on the present application to show inherency in the Bhardwaj et al. method. The present application indicates the Bhardwaj et al. parameters are incapable of producing the same effects as applicants' method. Applicants' disclosure indicates that steps in excess of one second will not provide the desired effects; see page 13, lines 15-16. In Bhardwaj et al., the minimum duration of a step is two seconds; see column 6, line 19. Apparently, the steps are preferably 5 seconds. Column 2, lines 25 and 26 indicates the etch and/or depositions steps have periods of less than 7 ½ seconds or even 5 seconds to reduce surface roughness of the trench. Further, the examples set forth in column 6, lines 50-67 indicate the steps are in the range of 2-15 seconds and are preferably 4-6 seconds. Consequently, the reliance on applicants' disclosure for the Bhardwaj et al. method inherently providing the same effects as attained by applicants is wrong.

For a proper rejection based on inherency, the Examiner has the burden of proof. If the Examiner is stating that the relied on portion of Bhardwaj et al. inherently forms a feature by always using an etchant as a dominant material, the Examiner has not met the burden of establishing a *prima facie* case of inherency. The fact that a certain result or characteristic ***may*** occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. *In re Rijckaert*, 9 F.3d 1531, 1532, 28 U.S.P.Q.2d 1955, 1956 (Fed. Cir. 1993); *In re Oelrich*, 666 F.2d 578, 581-82, 212 U.S.P.Q. 323, 326 (C.C.P.A. 1981). To establish inherency, extrinsic evidence must make clear that the missing descriptive matter is ***necessarily*** present in the thing described in the reference and that it would be so recognized by persons of ordinary skill in the art. Inherency

may not be established by possibilities or probabilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient. *In re Roberston*, 169 F.3d 743, 745, 49 U.S.P.Q.2d 1949, 1950-51 (Fed. Cir. 1999). In relying upon a theory of inherency, the Examiner must provide a basis in fact or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the prior art. *Ex parte Levy*, 17 U.S.P.Q.2d 1461, 1464 (B.P.A.I. 1990). The improper reliance on applicants' disclosure to provide inherency does not enable the Examiner to meet the burden because of the differences between applicants' process step durations and the durations of the Bhardwaj et al. reference.

In response to the rejection of claims 8-11, 21 and 22, the Examiner states that by gradually changing the power in the Bhardwaj et al. method, the corner of the trench would be rounded similarly as in the instant application. There is no rationale for the Examiner to make such a conclusion. Bhardwaj et al. does not disclose anything about obtaining rounded corners and provides no parameters to enable one of ordinary skill in the art to form a rounded corner.

In response to the comment in the Office Action, concerning the specific time periods of claims 12, 13, 26, 28, 30, 31, 40 and 41 during which the power remains at a constant wattage and the amount the power is changed, applicants can not agree that it would have been obvious to one of ordinary skill in the art to change the Bhardwaj et al. method to achieve the parameters set forth in the foregoing claims. Bhardwaj et al. is concerned with forming trench walls by alternately etching and depositing. The parameters differ widely from those set forth in these rejected claims. Bhardwaj et al. alternately etch and deposit for at least two seconds. Applicants have indicated the criticality of steps no greater than one second at page 13, lines 15-16. The examiner has not responded to this position that was discussed in previous responses.

In view of the submission of the Bailey Declaration, as well as the foregoing amendments and remarks, entry of the amendment and allowance of the application are in order.

The Examiner is invited to telephone the undersigned, Applicant's attorney of record, to facilitate advancement of the present application.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 07-1337 and please credit any excess fees to such deposit account.

Respectfully submitted,

LOWE HAUPTMAN & BERNER, LLP

Allan M. Lowe
Registration No. 19,641

USPTO Customer No. 22429
1700 Diagonal Road, Suite 300
Alexandria, VA 22314
(703) 684-1111
(703) 518-5499 Facsimile
Date: June 9, 2006
AML/tal